

What is claimed is:

1. A medical image electronic package for an object relating to an electronic
5 image comprising:
a message including a header and an object file attached to said message,
said object file comprising an electronic file relating to an image and
identifying information uniquely identifying the electronic image,
said header comprising a destination identifier, an origination identifier
10 and an attachment identifier, wherein said attachment identifier comprises an
object type identifier configured to identify the type of object file attached to
said message and a portion of said identifying information, wherein said portion
of said identifying information is extracted from said object file.
- 15 2. The medical image electronic package of claim 1 wherein said object file
comprises DICOM image file and wherein said identifying information
comprises an image unique identifier, and wherein said portion of said
identifying information comprises said image unique identifier.
- 20 3. The medical image electronic package of claim 1 wherein said object file
comprises an overlay annotation file and wherein said identifying information
comprises an image unique identifier corresponding to an image file associated
with said overlay annotation file, and wherein said portion of said identifying
information comprises a unique overlay file identifier and said image unique
25 identifier corresponding to said image file associated with said overlay
annotation file.
4. The medical image electronic package of claim 1 wherein said image forms
at least in part a study, wherein said object file comprises a report associated
30 with the study and wherein said identifying information comprises an study
unique identifier corresponding to an study associated with said report, and
wherein said portion of said identifying information comprises a unique report

identifier and said study unique identifier corresponding to said study associated with said report.

- 5 5. The medical image electronic package of claim 1 wherein said message is formatted for transmission by SMTP.
6. A packaging system for electronically packaging an object file relating to an electronic image file wherein the electronic image file includes identifying information uniquely identifying the image file, said packaging system
- 10 comprising:
- a message generator for generating a message to be transmitted, wherein said message generator is configured to attach the object to the message for transmission,
- 15 said message generator comprising a header generator wherein said header generator is arranged to generate an attachment identifier including an object identifier identifying the type of object attached to the message and a unique identifier comprising a portion of the identifying information uniquely identifying the image file.
- 20 7. The package system of claim 6 wherein said object file comprises DICOM image file and wherein said identifying information comprises an image unique identifier, and wherein said portion of said identifying information comprises said image unique identifier.
- 25 8. The package system of claim 6 wherein said object file comprises an overlay annotation file and wherein said identifying information comprises an image unique identifier corresponding to an image file associated with said overlay annotation file, and wherein said portion of said identifying information comprises a unique overlay file identifier and said image unique identifier corresponding to said image file associated with said overlay annotation file.
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9. The package system of claim 6 wherein said image forms at least in part a study, wherein said object file comprises a report associated with the study and wherein said identifying information comprises an study unique identifier
5 corresponding to an study associated with said report, and wherein said portion of said identifying information comprises a unique report identifier and said study unique identifier corresponding to said study associated with said report.

10. A method of electronically packaging an object file relating to an electronic
10 image file wherein the electronic image file includes identifying information uniquely identifying the image file, said method comprising the steps of:
obtaining the object file to be attached;
constructing a message with the object file attached to the message;
creating a header containing an attachment identifier including an object
15 identifier identifying the type of object attached to the message and a unique identifier comprising a portion of the identifying information uniquely identifying the image file.

11. The method of claim 10 wherein said message is an email message, and
20 further comprising the step of sending the message by way of SMTP.

12. The method of claim 10 wherein said object file comprises DICOM image file and wherein said identifying information comprises an image unique identifier, and wherein said portion of said identifying information comprises
25 said image unique identifier.

13. The method of claim 10 wherein said object file comprises an overlay annotation file and wherein said identifying information comprises an image unique identifier corresponding to an image file associated with said overlay
30 annotation file, and wherein said portion of said identifying information comprises a unique overlay file identifier and said image unique identifier corresponding to said image file associated with said overlay annotation file.

14. The method of claim 10 wherein said image forms at least in part a study,
wherein said object file comprises a report associated with the study and
wherein said identifying information comprises an study unique identifier
5 corresponding to an study associated with said report, and wherein said portion
of said identifying information comprises a unique report identifier and said
study unique identifier corresponding to said study associated with said report.

15. A status message generator at a medical image viewer for generating a
10 message containing status information concerning the viewing status of an
object file relating to an electronic image file wherein the electronic image file
includes identifying information uniquely identifying the image file, said status
message generator comprising:

15 a message generator configured to generate a status message when an
object file has been opened at the viewer,

said message generator comprising a header generator wherein said header
generator is arranged to generate an object identifier identifying the type of
object viewed and a unique identifier comprising a portion of the identifying
information uniquely identifying the image file.

16. The status message generator of claim 15 wherein said object file comprises
DICOM image file and wherein said identifying information comprises an
image unique identifier, and wherein said portion of said identifying
information comprises said image unique identifier.

17. A medical image viewing system comprising:

a remote viewer comprising:

an image receiver configured to receive from a central database through
an interface, an electronic image file, wherein the image file includes image
30 data and key information;

a relational database configured to store and relate the image data and the key
information;

an extractor configured to extract key information from the image file and to store and relate the image data and the key information in the relational database;

5 an input device configured to input an attachment into said viewer, wherein the attachment is to be related to the image file; and

a packaging system arranged to package the attachment in a transmittable package for delivery from the remote viewer to the central database, so that the attachment may associated with the image file in the central database.

10 18. The medical image viewing system of claim 17 wherein said package includes said key information.

15 19. The medical image viewing system of claim 18 wherein said key information comprises a unique image identifier corresponding to the image file.

20 20. The medical image viewing system of claim 17 wherein the image file is at least a part of a study; and wherein said key information further comprises a unique study identifier corresponding to the study.

21. The medical image viewing system of claim 17 wherein said package is a formatted for secure transmission over a public communication system.

25 22. The medical image viewing system of claim 17 further comprising an attachment storer arranged to store the attachment so that the attachment is related in the relational database to the image file.

30 23. The medical image viewing system of claim 17 wherein said attachment is an overlay.

24. The medical image viewing system of claim 17 wherein said attachment is a text report.

25. The medical image viewing system of claim 18 wherein the package comprises an e-mail header and the attachment, wherein said header includes identifying information arranged to identify a type of attachment.

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26. The medical image viewing system of claim 17 wherein the receiver is configured to receive the image file in a background process, said image receiver comprising a data requestor configured to request image files waiting to be sent by the central database.

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27. The medical image viewing system of claim 17 wherein said extractor is configured to extract the key information from the image file and to store and relate the image data and the key information in the relational database in a background process.

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28. A medical image viewing system comprising:

a remote viewer comprising:

an image receiver configured to receive through a remote interface, an electronic image file from a central data system, wherein the image file includes image data and key information, and wherein the receiver is configured to receive an image file in a background process;

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a relational database configured to store and relate the image data and the key information;

an extractor configured to extract key information from the image file and to store and relate the image data and the key information in the relational database in a background process;

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a display device in communication with the relational database; and a user input device coupled to said relational database and said display device, wherein said user input device is arranged to allow a user to select an image from the relational database in a foreground process, to display the image in a visible format at the display device; and

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a status message generator configured to generate a status message when an image file has been opened with the user input device; and a sender configured to send a status message through a remote interface to the central data system, wherein said status message generator is configured to submit the status
5 message to the sender.

29. The medical image viewing system of claim 28 wherein said status message generator operates in a background process.

10 30. The medical image viewing system of claim 28 further comprising an image file annotator configured to create an image annotation with user input at the user input device.

15 31. The medical image viewing system of claim 30 wherein said image file annotator operates in a foreground process.

32. The medical image viewing system of claim 30 wherein said annotation is an image overlay.

20 33. The medical image viewing system of claim 30 wherein said annotation is a text attachment.

25 34. The medical image viewing system of claim 28 wherein the viewer receiver further comprises a requestor configured to request the central data center to send the image file to the viewer receiver.

30 35. The medical image viewing system of claim 34 wherein the requestor is configured to request the central data system for image files upon the occurrence of a predetermined event.

36. The medical image viewing system of claim 35 wherein the predetermined event is the expiration of a predetermined time interval.

37. A central data system for a medical image management system comprising:

- 5 a receiver configured to receive an electronic medical image file including key information, from an electronic medical image file transmitter, the electronic medical image file transmitter being associated with an medical imaging device and being arranged to transmit an electronic image file including key information to a central data system,
- 10 a sender configured to transmit electronic image files through a remote interface to an image viewer;
- a relational database arranged to store the key information associated with the electronic image files, said relational database including a tracking database,; and
- 15 an image storing and routing system operative to extract the key information from said image file, to store the key information in said relational database, and to submit the image file to the sender from which said image file is transmitted to a designated remote viewer,
- 20 wherein said receiver is configured to receive a status message from the image viewer corresponding to transmission status of the image, and wherein said tracking database is configured to store information related to transmission status of the image.

38. A central file system for a medical image management system comprising:

- 25 a receiver configured to receive an electronic medical image file of a study, from an electronic medical study transmitter, said image file including key information including information associating the image file with a unique study, the electronic medical image file transmitter being associated with an medical imaging device and being arranged to transmit the electronic image file including key information to a central data system,
- 30 a sender configured to transmit a unique study including an electronic image file through a remote interface to an image viewer;

a relational database arranged to store the key information associated with the electronic image file, said relational database including a tracking database arranged to track images transmitted from the sender; and

an image storing and routing system operative to extract the key
5 information from said image file, to store the key information in said relational database, and to submit the image file to the sender from which said image file is transmitted to a designated remote viewer,

wherein said receiver is configured to receive a status message from the image viewer corresponding to viewing status of at least one image of said
10 unique study, and wherein said tracking database is configured to store information related to viewing status of the image.

39. A medical image file management system comprising:

a central data system comprising a receiver configured to receive an
15 electronic medical image file including key information, from an electronic medical image file transmitter, the electronic medical image file transmitter being associated with a medical imaging device and being arranged to transmit an electronic image file including key information to a central data system,

a sender configured to transmit electronic image files through a remote
20 interface to an image viewer;

a relational database arranged to store the key information associated with the electronic image files; and

image storing and routing logic operative to extract said key information from said image file, to store said key information in said relational database,
25 and to submit the image file to the sender from which said image file is transmitted to a designated remote viewer,

wherein the key information in the image file includes route information indicating a viewer to which the image file is to be routed, said central data system further comprising:

30 a verification system configured to verify allowance of a route contained in the route information contained with said image file before said sender transmits the file to a viewer.

40. The medical image file management system of claim 39 wherein the relational database comprises a file including legitimate addresses for a viewer, wherein the verification system is configured to verify existence of an address
5 corresponding to the route information contained in the image file.

41. The medical image file management system of claim 39 wherein the relational database comprises a file including authorizations for a viewer to receive a file, wherein the verification system is configured to verify
10 authorization of a viewer to receive the image file.

42. The image file management system of claim 39 further comprising an administrative access system configured to provide access to an administrator to said verification system to correct image files addresses that are not verified as
15 legitimate by the verification system.

43. A medical image management system comprising:
a central data system comprising a receiver configured to receive an electronic medical image file including key information, from an electronic
20 medical image file transmitter, the electronic medical image file transmitter being associated with an medical imaging device and being arranged to transmit an electronic image file including key information to a central data system,
a sender configured to transmit electronic image files through a remote interface to an image viewer;
25 a relational database arranged to store the key information associated with the electronic image files;
image storing and routing logic operative to extract said key information from said image file, to store said key information in said relational database, and to submit the image file to the sender from which said image file is
30 transmitted to a designated remote viewer;
an image file archive; and

an archiving system configured to archive the image file in the image file archiver.

5 44. The medical image file management system of claim 43 wherein the archiver comprises a lifetime storage system.

45. A system for packaging an electronic medical image file for secure transmission, wherein the electronic image file includes key information concerning the image file, comprising:
10 a message generator configured to generate a message having a header, wherein said header identifies a type of image file to be attached to the message, said message generator further being configured to attach the image file as an attachment to the message;

15 a transmitter for transmitting the message in a secure transmission format.

46. The system of claim 45 wherein said message generator comprises an e-mail generator.

20 47. The system of claim 45 wherein said secure transmission format is SSL.

48. A system for lifetime storage of image files accessible by way of a public communication system, comprising:

25 a data center comprising a receiver configured to receive an electronic medical image file including key information, from an electronic medical image file transmitter, the electronic medical image file transmitter being associated with an medical imaging device and being arranged to transmit an electronic image file including key information to a central data system,

a sender configured to transmit electronic image files through a remote interface to an image viewer;

30 a relational database arranged to store the key information associated with the electronic image files; and

image storing and routing system operative to extract said key information from said image file, to store said key information in said relational database, and to submit the image file to the sender from which said image file is transmitted to a designated remote viewer

5 an archive arranged to store the image file on a tape system.

49. The system of claim 48 wherein the tape system stores the image file according to the imaging center of the image file origin.

10 50. The system of claim 49 wherein the tape system stores the image file according to imaging modality.

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